

Jet Propulsion Laboratory

INTEROFFICE MEMORANDUM

911-xx-xxx- ESB:aa

December 14, 2004

TO: A. M. Bhanji / R.W. Sible

FROM: E. S. Burke

SUBJECT: Minutes for the DSS-65 Downtime Readiness Review (DTRR) held December 14, 2004.

DSS-65 Downtime Readiness Review

The DSS-65 Downtime Readiness Review (DTRR) was held on December 14, 2004 at JPL in Building 238-543 with Madrid staff participating to evaluate the readiness to begin the Relocation and Re-commissioning, Antenna Controller Replacement (ACR) and Microwave Subsystem Controller (USC).

The board unanimously approved the DSS-65 downtime as planned.

Review Board

Gene Burke, Chairman	DSN RAPSO Manager
Dennis Buck	Antenna Front End & Science Support Manager, Office 923
Jim Buckley	Service Management Office Representative, Office 921
Dave Recce	Infrastructure, Verification & Validation Office Representative, Office 924
Sherill Hampton	ITT, O&M Contractor Engineering Manager
Jean Patterson	Division 33 Representative to IND
Jesus Gimeno	MDSCC Representative, Systems Engineering
Pablo Perez-Zapardiel	MDSCC Representative, Antenna Engineering
Fred Battle	DSMS Safety Engineer
Art Andujo	Board Secretary

Attendees

Ahlstrom, Hal	Hames, Peter	Recce, Dave
Bartos, Ken	Hampton, Sherill	Retana, Joaquin
Battle, Fred	Hofhine, Doug	Roldan, Gil
Buck, Dennis	Link, Christopher	Sehic, Asim
Burke, Gene	Manalo, Leslie	Seibel, Wayne
Cucchissi, John	Matossian, Harout	Toyoshima, Ben
Franco, Manuel	Owen, Chris	Van Sickler, Peter
Freiley, Art	Perez-Zapardiel, Pablo	Watzig, Gary
Gimeno, Jesus	Patterson, Jean	Welch, Susan

Introduction – *G. Burke*

The Downtime Readiness Review Board was introduced and the Process Definition was reviewed.

DSS-65 Downtime Overview – *J. Cucchissi*

The DTRR will review and assess the readiness for all activities planned for the tasks scheduled to occur between January 31, 2005 and July 3, 2005. At this time there are no major issues preventing the relocation or the USC task from taking place, there is though a problem with the ACR software problems being experienced that would prevent the Antenna Controller Replacement task from taking place.

Associated Tasks

There are other associated tasks that have been scheduled to occur during the downtime period and have been included in the integrated schedule. They are the NSP 5.5 Downlink testing task, the new weather station installation, MDSCC installation of pre-existing LNA ECO Modkits. Madrid assured the board that the associated tasks would be unobtrusive to the major tasks.

Review Scope

The scope of this review was limited to discuss the three major tasks planned during the downtime; the relocation task, the Antenna Controller Replacement task (H/W only) and the Microwave Subsystem Controller task. The ACR software readiness will be reviewed separately.

Dependencies

Due to several issues with the ACR software it will become necessary to wait for the satisfactory resolution to those issues before beginning work on the DSS-65 ACR task. The hardware to be installed for this task requires the ACR software. Another dependency for the ACR installation is the NSP Downlink software. It is planned to install NSP version 5.5. A DDR is scheduled to approve the NSP 5.5 software for usage on February 02, 2005. If NSP 5.5 is unavailable for installation the complex will use version 4.1.3. Neither of the major tasks are dependant on each other, therefore if any one task is not approved or is not carried out, the other tasks will be unaffected. New support files are required to be delivered to NSS, however if the ACR task is not done it will become necessary to revert to previous NSS support files.

Agenda/Schedule:

- Antenna Relocation Task Summary *John Cucchissi*
- Antenna Mechanical and Structural Modifications *Asim Sehic*
- Microwave Subsystem Controller Upgrade..... *Leslie Manalo*
- Operations Test Plan..... *Gil Roldan*
- Integrated Downtime Schedule..... *John Cucchissi*
..... *Ken Bartos*
- Discussion..... *DTRR Board*

Refer to the following site for a detailed set of meeting minutes, presentation materials and RFA/Action items: <http://rapweb.jpl.nasa.gov/DTRR.html>

Antenna Relocation Task Summary – J. Cucchissi

The DSS-65 antenna relocations tasks involves building a new foundation and track, replace damaged or worn azimuth axis components and the restoration of axis rate to full operational specification. An overview and detailed description of the relocation plan was presented, including safety measures and the decision protocol with contingency plans for lifting and moving the antenna to the new foundation. The detailed antenna relocation plan has been completed and is in the process of being signed off. There remain some questions from the safety engineer regarding wind speed tolerances during the relocation and a Request For Action (RFA) was submitted to address the outstanding question. (See RFA's below) All preparations for the relocation are scheduled to be completed as planned.

- Foundation construction is complete.
- Track and pintle bearing are installed.
- New site facilities have been installed and are ready for testing.
- Ground preparation is complete for transportation of antenna to new foundation.
- Required jacking pads are installed and the weldments certified.
- Punch list agreement completed for facilities and antenna foundation. Work is proceeding to address the list.
- Detailed relocation plan has been developed and approved by the contractor, subcontractor, JPL Cognizant Engineer, Task/Site manager and the Safety Engineer.

Relocation Modkit Status

Due to the nature of the relocation work and allowances in the downtime readiness criteria ETA addenda and paper ECO modkits for antenna and facilities will be provided after the fact. Modkits will provide as-built drawings. All major antenna hardware is GFE, provided to the onsite contractor for assembly installation and testing. There are no liens except for drive motor spares, which are planned to be onsite by the end of the downtime. However spares are available onsite that are designated for other 34 meter antennas. All paper modkits consisting of installation instructions for MDSCC personnel are, or will be onsite prior to the downtime. A detail of all modkits were discussed and are listed in the presentation. It was decided by the task team to document the MDSCC instructions in Modkit form as the station personnel are very familiar with the methodology of the Modkit.

Pre-Relocation Testing

Baseline RF measurements were completed in October, 2004. The analysis and report is in progress, preliminary results indicate that performance is nominal per the 810-005. OE directed testing will be scheduled prior to the downtime. MDSCC station directed testing will be negotiated with the task manager, so far it has been agreed that servo baseline testing will be performed.

Mechanical and Structural Modifications for Relocation Hardware Status – A. Hesic

Modkit deliveries are under the Antenna foundation and the Jacking pad installation assemblies. All Modkits required under these assemblies have been completed and are, or will be on site prior to the start of the downtime. There are no liens other than the hardware spares.

It was decided later that the SKF Azimuth wheel bearings already purchased and delivered to MDSCC be replaced with those from a different manufacturer, Torrington. Past experience has

proven that the Torrington bearings provide smoother and quieter operation than the SKF brand. The Torrington bearings are scheduled to arrive at the station by mid-January, but if they do not arrive in time for installation the SKF brand bearings will be used.

It is expected that the azimuth drive DC motors will be delivered before their need date, currently the motors are being refurbished and recertified for their new operating speed of 2300 RPM. It is expected that the motors will arrive at the site by the end of December well before the downtime start date. There are other motors available for use from the spares pool of the other 34 meter antennas onsite if necessary.

The Maintenance and Sparing Agreement has not completed the signature cycle yet, but is expected to be delivered prior to the downtime. All hardware procedures are complete and available to site personnel.

The Planetary Gear Reducer required as a spare is in the process of being acquired and is expected onsite before the end of the downtime.

ACR Hardware Status – *H. Ahlstrom*

The ACR hardware Modkits and Meskits were discussed, all hardware and documentation is at the station or in transit. Those items listed in the presentation that are not will arrive by the start of the downtime well before their need dates, with the exception of some hardware spares which should arrive by the end of February.

All hardware installation procedures are released and are included in their respective modkits.

The operations training plans based on discussions with Goldstone personnel have been developed and are awaiting review by MDSCC personnel before being finalized. Delivery is scheduled for the end of January, with training

The ACR installation and test schedule originally developed for the cancelled DSS-15 installation is complete and has been reviewed and modified for integration in to the DSS-65 integrated schedule.

It was reiterated that if the Antenna Controller software is ready then the hardware installation will take place, but if the anomalies detected at DSS-14 are not resolved by the decision point stated earlier then the installation will not be done. Due to lessons learned from the DSS-14 ACR task there are some changes that are required to be made to the AMC not included in the delivered Modkit. The changes required will be documented and delivered at a later date before the installation is required.

Microwave Subsystem Controller and Consolidated Software Status – *L. Manalo*

The status presented is intended as a review for all DSN antennas scheduled to undergo the USC task upgrade. All documentation has completed review and is released on PDMS. All hardware, software and documentation has, or will be delivered to all DSN sites by December 17, 2004, with the exception of one net spare laptop that will arrive on site before the need date.

It is planned to train site personnel to perform the USC installation during the first antenna installation from each complex, with the exception of DSS-63. Software and hardware engineers will be available for assistance during subsequent installations. Installation training was completed at GDSCC during the DSS-14 installation and at CDSCC during the DSS-45 installation, MDSCC training will be done during the DSS-65 installation by Mid-January.

The only lien open for this effort is a testing lien against the DSS-14 High Power Transmitter, which will be addressed by the end of this week.

There are several Anomaly Reports (AR's) that are being worked on at this time.

A detailed description of the work involved in installing the USC subsystem. It has proven to be a very simple task.

The USC task team has agreed to inform the Review board of Modkit delivery status until they have all been delivered.

The task team has requested that all USC installation downtimes be changed from 6, 7 or 14 days to 10 Days. This issue was discussed and an RFA was taken by Gene Burke and RAPSO investigate modifying to address look at modifying the downtime RAPSO.

DSS-65 Operations Test Plan – *G. Roldan*

The Operations Test Plan was developed with Ken Bartos and based on the DSS-55 OTP and revised as it applies to a HEF antenna. The test plan was discussed as well as what testing would be performed and for what purpose. Questions arose as to what manner would the test results be presented, specifically what and where would the results be documented, but it was determined that the methodology of this was not pertinent to the readiness review and would be addressed in an RFA submitted during the review.

ITT will plan and scheduled the tests and be performed by MDSCC personnel. Data is to be analyzed by ITT and JPL personnel who will also document and publish results as required.

Integrated Downtime Schedule – *J. Cucchissi and K. Bartos*

A summary of the methodology in developing the integrated schedule was discussed. The integrated schedule was developed under the assumption the ACR software would be ready for installation prior to the downtime. The schedule outlined includes all work to be done during the downtime period by all groups involved; MTC, DSN O&M, JPL Engineering MDSCC personnel. Portions were developed by the responsible groups involved. The relocation segment

was developed by MTC; the ACR hardware and USC portions were developed by the task teams at JPL; the OTP was developed by the DSN O&M team. The schedule includes an early VLBI track to aid in antenna reference location data gathering, as well as the associated tasks to be performed by MDSCC personnel.

The station management and personnel have reviewed the integrated schedule and other documentation and have committed to the plan and to all work outlined therein. The schedule is based on a work week of 40 hours. All teams have committed to extended hours and weekends as a contingency if delays are encountered in the schedule or particularly due to inclement weather. Contingencies were discussed and were deemed adequate for the work involved.

DTRR Summary

It has been determined that the DSS-65 downtime tasks discussed have adequately been prepared and should proceed as planned. There are however some issues requiring additional preparation or resolution prior to the downtime and have been documented through RFA's.

The only concern at this time is the readiness of the Antenna Controller Software, but the plan to forego the ACR hardware installation if software issues have not been satisfactorily resolved is acceptable to the review board. A mini review will be held to determine the readiness of the ACR software.

Board Summary

The Board reviewed each of the success criteria following the presentation and taking under consideration the deviations it is recommended that DSS-65 begin its downtime as planned. Comments provided by each of the Board Members follow:

Jim Buckley – Proceed with the downtime. He agrees that it is necessary to proceed with the downtime as the relocation plan seems complete and that the ACR work should not interfere with those plans. Although there are some questions from the safety engineer it is felt that these issues are easily resolved.

Dave Recce – Proceed with the downtime. All the work that has been done is impressive particularly the contingency plan for the ACR work.

Sherill Hampton – Proceed with the downtime. The relocation work is definitely ready to proceed, but there are some concerns with the dependency on the NSP 5.5 testing that may cause delays and the issues with the ACR task.

Jean Patterson – Proceed with the downtime. There are some minor issues that should be resolved with the safety report and the spares.

Jesus Gimeno – Proceed with the downtime. Considering that this review is being held two weeks earlier than usual it is difficult to confirm the arrival of many required materials. Confident with the relocation and USC tasks as well as the contingency plan for the ACR task.

Pablo Perez-Zapardiel – Proceed with the downtime. Happy with the relocation and the USC task, but would like an RFA to clarify what needs to be done to the Mark IV controllers in case the ACR task is not performed specifically what is the plan for updating the ACS with the new antenna latitude and longitude information to the EPROM's.

Fred Battle – Proceed with the downtime. Very good safety plan but the wind speed tolerance limits for the antenna while on the trailers needs to be included.

Gene Burke – Proceed with the downtime. The relocation and USC tasks seem well prepared to proceed, but the ACR will need to be monitored. Any extensions need to be brought to the attention of the board as soon as possible.

Request For Action Summary:

Accepted RFA's

1. **Concern:** Whether to schedule additional two weeks of downtime to accommodate ACR software testing and delayed start of DSS-65ACR within downtime.
Recommendation: Add 2 weeks. Include "go"/"no-go" decision points in schedule to assess S/W status before starting ACR H/W installation.
Requested by: John Cucchissi
Assigned to: John Cucchissi
Due Date: 01/04/2005
Status: Closed 12/15/2004
2. **Concern:** Need to define who signs off on MSA's in new IND organization.
Recommendation: None.
Requested by: Dave Recce
Assigned to: Wayne Sible
Due Date: 01/04/2005
Status: Open
3. **Concern:** Station location, horizon and transmitter mask is not planned to be published in an office document that is retrievable and referenceable.
Recommendation: The station location, horizon and transmitter masks should be officially reviewed and published in a retrievable and referenceable source. Measurement method, procedure and results should be officially reviewed.
Requested by: Art Freiley
Assigned to: Gil Roldan
Due Date: 07/03/2005
Status: Open

4. **Concern:** What is the maximum wind speed with the antenna on the trailer (not mechanically attached to foundation or anchors) that assembly is stable, such that if wind speed increases, the antenna can be moved by the wind?
What is mitigation for this situation?
Recommendation: None.
Requested By: Fred Battle
Assigned to: Ben Saldua
Due Date: 01/04/2005
Status: Open

5. **Concern:** Need to ensure any horizon masks, transmitter masks, SSFs, tables etc., are updated and provided to NSS in a timely fashion.
Recommendation: None.
Requested by: Jim Buckley
Assigned to: Gil Roldan and Mike Wert
Due Date: 06/03/2005
Status: Open

6. **Concern:** RF antenna calibration pre-downtime measurements were not presented. This data should be reviewed to establish performance values and curves. This/these results should have been presented in this review.
Recommendation: Confirm that pre-downtime data are adequate to assess RF performance.
Requested by: Art Freiley
Assigned to: John Cucchissi
Due Date: 01/04/2005
Status: Open

7. **Concern:** The ACR go/no-go decision is going to be delayed until February 22, 2005 or by the end of March. If the final decision is no-go and the Mark IV controllers should remain in place, then, APA and ACS will have incorrect station coordinates latitude and longitude due to the new antenna location. Analysis of the potential pointing errors should be made and determine whether they are acceptable or not. If the result is no, this may imply a new APA S/W version and a new ACS firmware version to correct the station location.
Recommendation: None.
Requested by: Jim Buckley
Assigned to: Gil Roldan
Due Date: 01/03/2005
Status: Open

Advisory RFA's

1. **Concern:** Do the stations feel they have received sufficient training to install the new USC Modkits by themselves.
Recommendation: Complete training and address in DDR.
Requested by: Sherill Hampton
Comment: Each Complex receives O&M training by CDE & OE (confirmed at DDR.) Installation instructions provided in Modkit. Also, have CDE & OE available for consultation.
Assigned to: Leslie Manalo
2. **Concern:** For each USC downtime, an OCR will need to be scheduled.
Recommendation:
Requested by: Jim Buckley
Comment: Not germane to this review. Task will participate in OCR at program office request. DDOSO should schedule
Assigned to: Jim Buckley
3. **Concern:** Will need to have a DSS-65 OCR a few days prior to the scheduled return to service on 07/03/2005.
Recommendation:
Requested by: Jim Buckley
Comment: Not germane to this review. Task will participate in OCR at program office request. DDOSO should schedule
Assigned to: Jim Buckley

Rejected RFA's

1. **Concern:** CCG common configuration: DSS 43 and 63 block diagram displays are not conforming to the requirement of presenting common configurations and uniform designs. Diagrams between stations are not the same and do not conform to the interface agreement and standard term agreed upon. Current displays and labels are confusing to customers and stations.
Recommendation: displays and tables need to be changed to agree with DSS-14 displays to the maximum extent possible.
Requested by: Art Freiley
Comment: Not germane to this review. Also, this is a design & configuration issue with pre-existing H/W. USC S/W accommodates design extant at each antenna.